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(71) Applicant ( <i>for all designated States except US</i> ): BRASILIA (UK) LIMITED [GB/GB]; 800a High Road, Rear of Gibson House, Tottenham, London N17 0DS (GB).	(72) Inventor; and (75) Inventor/Applicant ( <i>for US only</i> ): PUGH, Jeffrey, Robert [GB/GB]; 14 Park Avenue, Potters Bar, Hertfordshire EN6 5EJ (GB).		Published With international search report.			
(74) Agent: NEEDLE, Jacqueline; W.H. Beck, Greener & Co., 7 Stone Buildings, Lincoln's Inn, London WC2A 3SZ (GB).						
(54) Title: FILTER HEADS FOR A BEVERAGE CONTAINER						
(57) Abstract						
<p>A plunger (10) is for use in the cylindrical glass container of a filter apparatus for making coffee. A filter head (2) of the plunger (10) is a tight fit within the container so that as it is pressed downwardly, liquid is filtered through a filter opening (4) whilst coffee grounds are pressed towards the base of the container. The filter head (2) is fabricated from a body member (24), a circular filter (18), and a retaining ring (26), the body member and the retaining ring having each been moulded from plastics material. To form the filter head (2), projections (42 and 40) of the retaining ring (26) are engaged within corresponding holes (44 and 30) of the body member (24), with the mesh (18) interposed therebetween. This interengagement of the ring and body member holds the filter (18) at both its centre and its perimeter. The interengagement, in which the periphery of the web (18) and of the retaining ring (26) are engaged in a groove (28) of the body member (24), takes place whilst the body member (24) is still warm from its moulding process. Shrinkage of the body member (24) as it cools causes the body member to engage and hold the periphery of the retaining ring (26).</p>						

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## FILTER HEADS FOR A BEVERAGE CONTAINER

The present invention relates to a method of fabricating a filter head for a beverage container, and to such a filter head.

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It is known to prepare a beverage, such as coffee, for example, by introducing hot water and the coffee into a container. A filter head is then pushed downwardly through the liquid in the container to filter the liquid through the filter head and to collect and retain coffee grounds at the base of the 10 container. Specific examples of such apparatus have come to be known as "cafetieres".

Originally, the filter heads were constructed of metal and/or featured a peripheral metal spring to retain an external skirt portion of the filter head 15 against the inner periphery of the container. However, in recent times, filter heads made of plastics material have become more common. Such plastics filter heads have the advantage that they do not scratch the material of the container and can be used more readily with plastics material containers.

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One example of filter apparatus of this type incorporating a filter head, preferably of plastics material, is disclosed in International publication No. WO95/33399. In an example of the filter head shown in this publication a filter mesh is retained within a skirt portion of the filter head which has been moulded from polypropylene. The filter mesh is placed in the mould and then the skirt 25 portion is moulded such that the filter mesh becomes part of the moulding. The plastics material extends through the mesh whereby it is retained. This is known as an overmoulding process.

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However, the overmoulding process has been found to be unsuitable where different plastics materials with different cooling and shrinking rates are used. Acetal, for example, shrinks more than polypropylene such that when the skirt portion is made by the overmoulding technique using acetal, the mesh becomes buckled and does not extend substantially tautly across a filter opening as is required. The applicants have found that this tendency to buckle the mesh 35 is an inherent problem in the overmoulding technique which cannot be cured by

changing the dimensions of the moulded product and/or by changing the amount of plastics material used.

5       The present invention seeks to provide a new method for fabricating a filter head which avoids or reduces the problems of the existing techniques.

According to a first aspect of the present invention there is provided a method of fabricating a filter head for a beverage container comprising the steps of providing a body member having a filter opening and carrying first engaging  
10      means, locating a web of filter material within said body member to extend across said filter opening, locating a retaining ring within said body member such that said web of filter material is interposed between said retaining ring and said body member, and interengaging said first engaging means with second engaging means of said retaining ring to retain said retaining ring, and hence  
15      said web of filter material, within the body member.

Embodiments of a method of the invention enable filter heads to be fabricated from any chosen materials. However, the method is particularly advantageous where the body member is of a plastics material, as the method  
20      enables the plastics material to be used to be chosen as required. For example, the body member may be of polypropylene or the body member may be of acetal. Where the filter head is to have the construction as set out in WO95/33399, referred to above, acetal is currently the preferred plastics material as it has good mechanical properties and good thermal memory.  
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Where the body member is of plastics material, the method may comprise the step of moulding the body member from the plastics material.

In a preferred embodiment, said body member has a peripheral skirt  
30      portion defining the filter opening. Said first engaging means may be carried on said skirt portion.

Preferably, the web of filter material is interposed between said retaining ring and said skirt portion. Preferably, the skirt portion comprises a generally  
35      transversely extending flange which extends around the perimeter of the filter

opening. Locating means may be provided at or near the periphery of the flange to receive the perimeter of the web of filter material.

For example, a groove or undercut may be provided to extend around the 5 periphery of the flange to receive the perimeter of said web of filter material.

In an embodiment, in which the body member has been moulded, the method further comprises the steps of locating the web of filter material within the body member, with its perimeter in engagement with any locating means 10 provided therefor, whilst the body member is still warm after moulding. Shrinkage of the plastics material of the body member as it cools, therefore, acts to retain the web within the body member.

The web of filter material may be of any appropriate construction. For 15 example, the filter material may be a plastics mesh. In this case it would generally be preferred that the plastics mesh be retained within the substantially rigid rim. Preferably, the web of filter material is a web of fine metal mesh which has some inherent stiffness.

20 Any appropriate engaging means may be provided to interengage the retaining ring and the body member. Furthermore, the retaining ring may have any appropriate form.

In a preferred embodiment, the retaining ring has an annular rim which 25 substantially corresponds in size and shape to that of the transversely extending flange of the skirt portion of the body member. The first and second engaging means comprise projections on one of the flange and rim and corresponding recesses on the other of the flange and rim. The projections are arranged to extend through the web of filter material and into the corresponding recesses. 30 To facilitate the interengagement, the web of filter material may be provided with holes for the passage of the projections.

The body member is preferably provided with a central boss for the receipt of a support shaft therefor. For example, the central boss may be carried 35 by the body member by ribs coupling the boss to the skirt portion. In one example, spaced ribs join the boss to the flange of the skirt portion. The

retaining ring may similarly be provided with a central boss, for example, carried by the rim by way of ribs.

Where both the retaining ring and the body member have a central boss,  
5 interengaging means may be provided on the central bosses to retain the body member and the ring together and/or to mutually locate the body member and the ring.

It would be possible to provide that said first and second engaging means  
10 are carried by the central bosses. However, in a preferred embodiment, the central bosses carry corresponding locating means to determine the position of the retaining ring relative to the body member. The first and second engaging means comprise projections and recesses spaced around the flange of the body member and around the rim of the retaining ring.

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The present invention also extends to a filter head fabricated by a method as defined above.

According to a further aspect of the present invention, there is provided a  
20 filter head for a beverage container, said filter head comprising a body member having a filter opening, a web of filter material located within said body member and extending across said filter opening, and a retaining ring, wherein first engaging means of the body member are interengaged with second engaging means of the retaining ring whereby the retaining ring and the body member are engaged and retain the web of filter material therebetween.

In an embodiment, said body member is formed of a plastics material, for example of polypropylene or of acetal.

30 For example, the body member has preferably been moulded from plastics material.

In a preferred embodiment, said body member has a peripheral skirt portion defining the filter opening.

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Preferably, the web of filter material is interposed between said retaining ring and said skirt portion. Preferably, the skirt portion comprises a generally transversely extending flange which extends around the perimeter of the filter opening. Locating means may be provided at or near the periphery of the flange  
5 to receive the perimeter of the web of filter material.

For example, a groove or undercut may be provided to extend around the periphery of the flange in which the perimeter of said web of filter material is received.

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In an embodiment, the filter material is a plastics mesh. In a presently preferred embodiment, the web of filter material is a web of fine metal mesh which has some inherent stiffness.

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In a preferred embodiment, the retaining ring has an annular rim which substantially corresponds in size and shape to the flange of the skirt portion of the body member. The first and second engaging means comprise projections on one of the flange and rim which are engaged in corresponding recesses on the other of the flange and rim. The projections extend through holes provided  
20 in the web of filter material.

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The body member is preferably provided with a central boss in which a support shaft is received. The central boss may be carried by ribs joining the boss to the flange of the skirt portion. The retaining ring may similarly be provided with a central boss carried by the rim by way of ribs.

Embodiments of the present invention will hereinafter be described, by way of example, with reference to the accompanying drawings, in which:

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Figure 1 shows a perspective view of a plunger for a filter coffee apparatus,

Figure 2 shows an exploded perspective view of a filter head of the plunger of Figure 1, and

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Figure 3 shows a perspective view from underneath of a body member of the filter head of Figure 2.

Figure 1 shows a perspective view of a plunger 10 for use in a filter apparatus, for example, for making a beverage such as coffee. In this respect, the filter apparatus, as is well known, comprises a generally cylindrical glass or plastics container (not shown) in which the plunger 10 is arranged to engage. A 5 filter head 2 of the plunger 10 is sized and shaped such that its external periphery is a tight fit within the inner periphery of the container so that as the filter head 2 of the plunger 10 is pressed downwardly through the container, liquid is filtered through a filter opening 4 and coffee grounds are pressed towards the base of the container.

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In the embodiment illustrated in Figure 1, and as is generally conventional, the filter head 2 of the plunger 10 has a central boss 6 connected to a support shaft 8. In the embodiment illustrated, this shaft 8 carries a button 12 which is to facilitate the filtering operation. A lid (not shown) for the container 15 may also be carried on the shaft 8.

The filter head 2 has a skirt portion, generally indicated at 14, which is connected to the central boss 6 by way of three radially extending ribs 16. A mesh filter 18 is stretched across the filter opening 4. Preferably, this filter 18 is 20 made from a web of fine metal mesh.

In the embodiment illustrated, the skirt portion 14 is substantially circular in perimetral shape and comprises a radially extending flange 20 which defines the perimeter of the filter opening 4, and a downwardly depending skirt 22 which 25 extends from the outer, substantially circular, periphery of the flange 20. It is the skirt 22 which is to engage against the inner periphery of the container and seal against the container to prevent coffee grounds moving upwardly passed the filter head 2.

30 The method by which the filter head 2 is manufactured is apparent from Figures 2 and 3. In this respect, and as shown in Figure 2, the filter head 2 is fabricated from three separate parts, namely a body member 24, a circular filter 18, and a retaining ring 26. In this respect, the body member 24 and the retaining ring 26 are each separately moulded from plastics material, for 35 example, from polypropylene or acetal.

Figure 2 shows a perspective view of the body member 24 from above- whilst Figure 3 shows the body member 24 from underneath. It will be seen that the body member 24 comprises the radially extending flange 20, and the depending skirt 22. Furthermore, three angularly spaced ribs 16 connect the  
5 flange 20 to the central boss 6. As is apparent from Figure 3, a perimeter groove 28 is formed to extend around the periphery of the flange 20 on its underside within the skirt 22. The underside of the flange 20 is also provided with a number of recesses or holes 30 which are regularly spaced circumferentially around the flange 20.

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The retaining ring 26 has a substantially circular rim 34 which generally corresponds in shape and size to the undersurface of the flange 20 within the perimeter groove 28. A central boss 36 is connected to the rim 34 by way of ribs 38. In this respect, the ribs 38 of the retaining ring 26 are spaced in the same  
15 manner as the ribs 16 of the body member 24. The rim 34 carries a number of upstanding projections 40 which are regularly spaced around the rim 34 and are positioned and sized to engage within the holes 30 of the flange 20. Similarly, the central boss 36 carries an upstanding projection 42 which is arranged to engage within a recess 44 (Figure 3) formed in the central boss 6 of the body  
20 member 24.

The filter 18 is cut from the web of mesh to be substantially circular, and has a central hole 46 therein which will accommodate the projection 42 of the retaining ring 26. The filter 18 also has a series of holes 48 regularly spaced  
25 circumferentially thereof for receiving the projections 40 of the retaining ring 26.

It will be appreciated that to form the filter head 2 it is necessary to engage the projections 42 and 40 of the retaining ring 26 within the corresponding holes 44 and 30 of the body member 24, with the mesh 18  
30 interposed therebetween, such that the projections 42 and 40 extend through the holes 46 and 48 of the filter mesh 18. When this has been done, the filter 18 is held both at its centre and around its perimeter by the interengagement of the retaining ring 26 and the body member 24. Furthermore, the orientation of the retaining ring 26 relative to the body member 24 is determined because, and as  
35 is apparent, the projection 42 and the hole 44 in which it engages are triangular.

This means that the ribs 38 of the retaining ring 26 are aligned with the ribs 16 of the body member 24.

The sequence in which the elements of the filter head 2 are engaged is a matter of choice. However, in the embodiment illustrated in which the projections are carried by the retaining ring 26, it is convenient to assemble the filter mesh 18 onto the retaining ring 26 such that the projections 40, 42 extend through the holes therefor in the mesh 18. Thereafter, the retaining ring 26 together with the mesh 18, is engaged on the body member 24 by fitting the projections 40, 42 into the holes 30, 44 therefor in the body member 24.

To ensure good retention between the elements, the projections 40, 42 are preferably snap fitted into the holes 30, 44 therefor.

However, the engagement of the three elements 18, 24, 26 of the filter head 2 can be made even more secure by using the shrinkage of the material of the body member 24 as it cools after it has been moulded. Thus, the constructional steps described above are commenced whilst the body member 24 is still warm from the moulding process. That is, the retaining ring 26 together with the filter 18 are engaged on the warm body member 24. In this respect, the groove 28 of the body member 24 is deep enough to receive the periphery of both the web 18 and the retaining ring 26. Thus, shrinkage of the body member 24 as it cools causes the body member to engage and hold the periphery of the retaining ring 26. As a result, in the completed filter head 2, the mesh 18 is held taut across the filter opening 4 whereby the mesh 18 is prevented from buckling. In addition, it is not easy to disengage the mesh from the filter head 2.

It would be possible to simplify the construction by holding the mesh 18 simply by its interposition between the body member 24 and the retaining ring 26. The engaging means 30, 40 could be omitted, so that the body member 24 and the retaining ring are engaged at their centre bosses 6, 36 and by the engagement of the retaining ring 26 in the groove 28. However, users of such filter heads 2 do apply pressures to the mesh 18 alone, for example, when washing, or simply fingering, the filter head 2. If the periphery of the mesh 18 is not physically held, there is a risk that such activities will cause the mesh 18 to

be pulled out from between the ring 26 and the body member 24. Accordingly, mechanical means positively holding the periphery of the mesh between the retaining ring and the body member are generally preferred. In the embodiment illustrated, this positive mechanical hold is by way of the projections 40

5 extending through the holes 48 of the mesh. Alternative means may, of course, be provided.

It will be appreciated that it is possible for some or all of the projections on the ring 26 to be alternatively provided on the body member 24, with the

10 corresponding holes therefor being provided on the ring 26.

Generally, a container for a filter apparatus will have a generally circular cross section such that the filter head will have a generally circular shape as illustrated. However, it will be appreciated that the filter head may have an

15 alternative peripheral shape if required.

In the embodiment illustrated, the skirt 22 depends downwardly from the flange 20. Alternative designs of filter apparatus provide for a skirt which extends upwardly from the periphery of the flange. Additionally and/or

20 alternatively, and irrespective of the design of the skirt, the skirt may be biased outwardly by way of a spring. Thus, for example, the spring may be provided with a downwardly depending skirt or with an upwardly extending skirt. The invention may be utilised with any construction of filter head.

25 It will be appreciated that other variations and modifications may be made to the embodiments as described and illustrated within the scope of the present application.

CLAIMS

1. A method of fabricating a filter head for a beverage container comprising the steps of providing a body member having a filter opening and carrying first engaging means, locating a web of filter material within said body member to extend across said filter opening, locating a retaining ring within said body member such that said web of filter material is interposed between said retaining ring and said body member, and interengaging said first engaging means with second engaging means of said retaining ring to retain said retaining ring, and hence said web of filter material, within the body member.
2. A method as claimed in Claim 1, where said body member is of plastics material, the method further comprising the step of moulding the body member from the plastics material.
3. A method as claimed in Claim 1 or Claim 2, wherein said body member has a peripheral skirt portion defining said filter opening, and wherein web of filter material is interposed between said retaining ring and said skirt portion.
4. A method as claimed in Claim 3, wherein the skirt portion comprises a generally transversely extending flange which extends around the perimeter of the filter opening, and further comprising the step of locating the perimeter of the web of filter material on locating means provided at or near the periphery of said flange.
5. A method as claimed in any preceding claim, in which the body member has been moulded, the method further comprising the steps of locating the web of filter material within the body member whilst the body member is still warm after moulding such that any shrinkage of the plastics material of the body member as it cools acts to retain the web within the body member.
6. A filter head when fabricated by a method as claimed in any of Claims 1 to 5.
7. A filter head for a beverage container, said filter head comprising a body member having a filter opening, a web of filter material located within said body

member and extending across said filter opening, and a retaining ring, wherein first engaging means of the body member are interengaged with second engaging means of the retaining ring whereby the retaining ring and the body member are engaged and retain the web of filter material therebetween.

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8. A filter head as claimed in Claim 7, wherein said body member is formed of a plastics material, for example, of polypropylene or of acetal.

9. A filter head as claimed in Claim 7 or Claim 8, wherein said body member  
10 has been moulded from plastics material.

10. A filter head as claimed in any of Claims 7 to 9, wherein said body member has a peripheral skirt portion defining said filter opening, and said web of filter material is interposed between said retaining ring and said skirt portion.

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11. A filter head as claimed in Claim 10, wherein said skirt portion comprises a generally transversely extending flange which extends around the perimeter of the filter opening, and locating means are provided at or near the periphery of said flange to receive the perimeter of the web of filter material.

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12. A filter head as claimed in Claim 11, wherein said locating means comprises a groove or undercut provided to extend around the periphery of said flange, the perimeter of said web of filter material being received within said groove or undercut.

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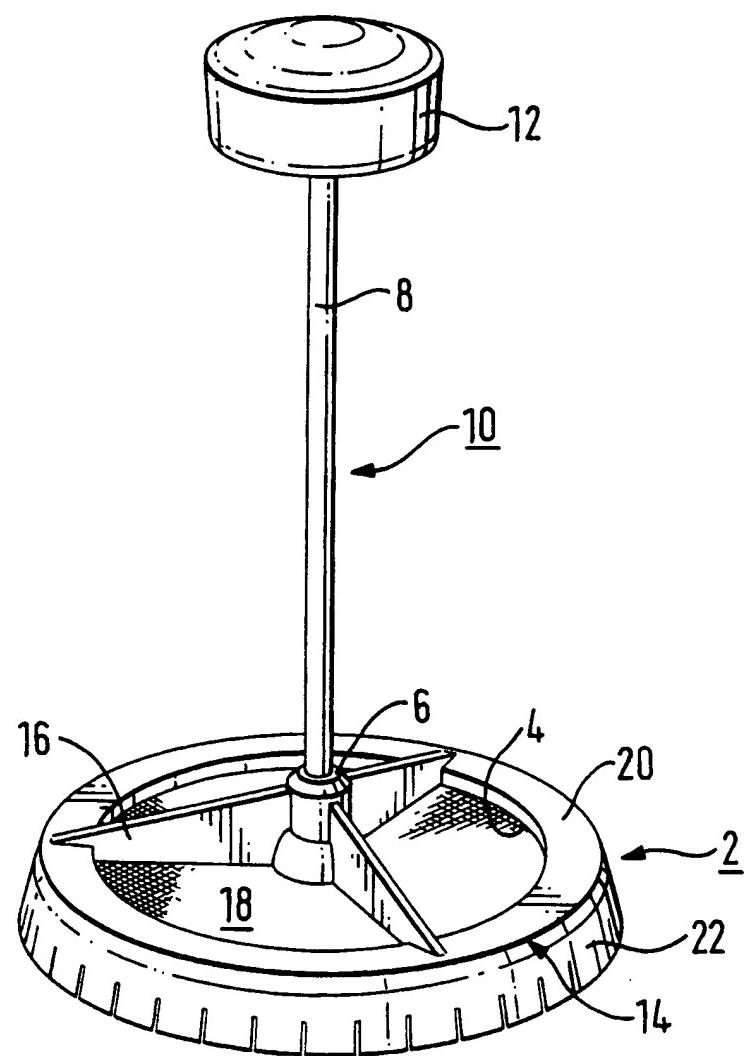
13. A filter head as claimed in any of Claims 7 to 12, wherein said web of filter material is a web of fine metal mesh which has some inherent stiffness.

14. A filter head as claimed in any of Claims 7 to 13, wherein said body  
30 member has a peripheral skirt portion defining said filter opening, and said retaining ring has an annular rim which substantially corresponds in size and shape to a generally transversely extending flange of the skirt portion of the body member.

15. A filter head as claimed in Claim 14, wherein said first and second engaging means comprise projections on one of the flange and rim which are engaged in corresponding recesses on the other of the flange and rim.
- 5 16. A filter head as claimed in any of claims 7 to 15, wherein the body member is provided with a central boss in which a support shaft is received.
- 10 17. A method of fabricating a filter head for a beverage container substantially as hereinbefore described with reference to the accompanying drawings.
18. A filter head for a beverage container substantially as hereinbefore described with reference to the accompanying drawings.

1 / 2

FIG. 1



2 / 2

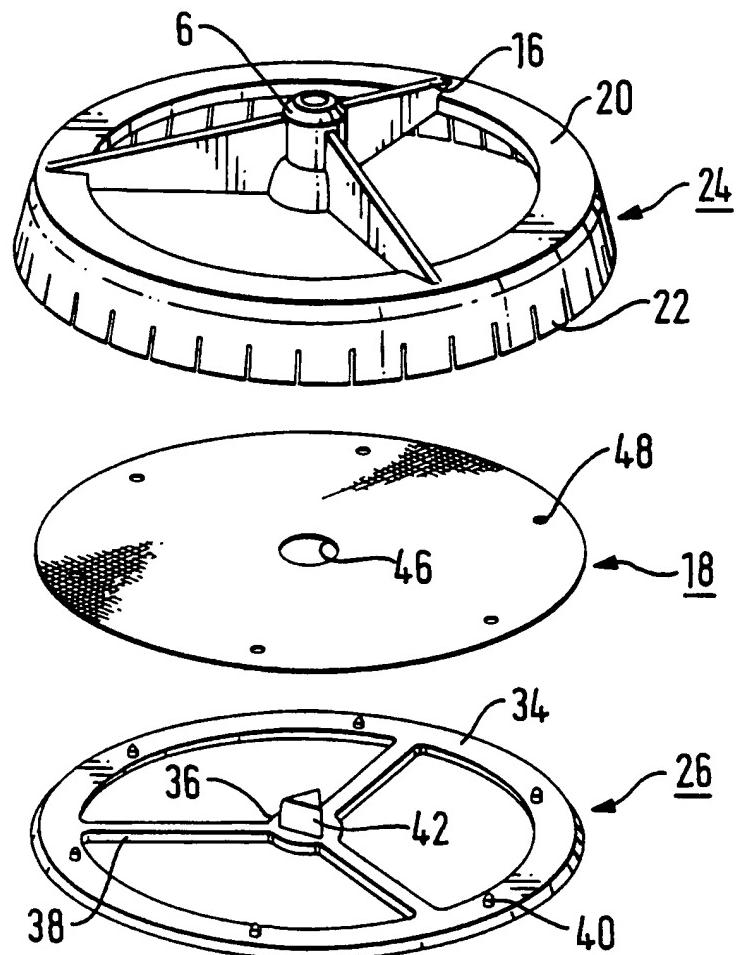


FIG. 2

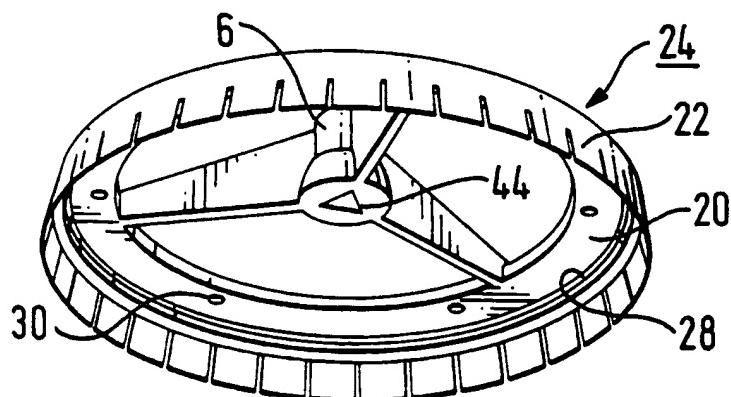


FIG. 3

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 97/03254

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 A47J31/20

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 167 423 A (BONDANINI) 8 January 1986  see page 4, line 9 - page 5, line 16; figures	1,3,4,6, 7,10-18
Y	DE 87 16 601 U (MAXS AG) 23 June 1988  see page 8, paragraph 3 - page 9, paragraph 2; figures 1,2,2A	2,5,8,9
X	US 5 277 103 A (COX) 11 January 1994  see column 2, line 39 - line 63; figures 1,3	1-3,6-9
A	FR 2 300 532 A (BONDANINI) 10 September 1976  see page 2, line 33 - page 3, line 36; figures 1,2	1,3,6,7, 10,13
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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**INTERNATIONAL SEARCH REPORT**International Application No  
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<b>C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
<b>Category</b>	<b>Citation of document, with indication, where appropriate, of the relevant passages</b>	<b>Relevant to claim No.</b>
A	FR 1 527 501 A (COLE) 31 May 1968 see page 1, right-hand column - page 2, left-hand column; figures -----	1,6

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Int.	Application No
PCT/GB 97/03254	

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 167423 A	08-01-86	FR 2564718 A FR 2573298 A DE 3561127 T JP 61128925 A US 4650583 A	29-11-85 23-05-86 21-01-88 17-06-86 17-03-87
DE 8716601 U	23-06-88	NONE	
US 5277103 A	11-01-94	NONE	
FR 2300532 A	10-09-76	NONE	
FR 1527501 A	06-11-68	NONE	